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REPORT

OF

MESSRS. JOHN CHILDE, W. J. McALPINE AND JAS. P. KIRKWOOD,

CIVIL ENGINEERS,

ON THE

IMPROVEMENT OF THE HARBOUR OF MONTREAL,

AND ON THE

TRADE AND NAVIGATION OF THE ST. LAWRENCE.

At a Meeting of the Montreal Harbour Commissioners, held on the 24th April, 1857, the following resolution was adopted :—

> "That in view of the augmenting trade of the Port, and of the proximate completion of the 20-feet Channel in Lake St. Peter, the Board are of opinion that the time has arrived for taking into consideration the question of increasing the capacity of the Harbour; and that, in order to attract public attention to the subject, and to elicit an expression of public opinion, it is resolved that the Report this day handed in by Mr. Young be published, and the Plans of Docks prepared by Mr. Forsyth be left for public inspection in the Merchants' Exchange."

HARBOUR OFFICE,
MONTREAL, 30th May, 1857.

JOHN G. DINNING, Esq.,
Secretary Board of Trade.

SIR,—I am directed by the Harbour Commissioners to transmit herewith, a copy of their Chairman's letter on the subject of the necessity for increased Harbour accommodation; and to beg that you will take an early opportunity of submitting the same to the Council of the Board of Trade, in order to elicit from them an expression of opinion upon this very important matter.

The Engineers' Plans, alluded to in Mr. Young's letter, will be left in the Merchants' Exchange this afternoon, and you will have the goodness to place them in the Reading-Room where they may be easily referred to.

I have the honor to be,
Sir,
Your obedient servant,
ALEX. CLERK,
Secretary.

OFFICE OF THE BOARD OF TRADE,
Montreal, 9th Feb., 1857.

SIR,—I beg to subjoin an extract from the minutes of the Special General Meeting of the Board held yesterday, embodying a resolution to be submitted to the action of the Council at their first meeting, viz.:—

> *Resolved*,—"That the Council of the Board be instructed to suggest to the Harbour Commissioners the propriety of placing the whole subject of Harbour enlargement before two or more qualified Engineers, to obtain estimates, and an opinion as to the place where increased accommodation can be secured at the least cost and with the greatest facilities to the commerce of the Port."

Have the goodness to place this before the Commissioners without delay.

I have the honor to be,
Sir,
Your most ob'dt. servant,
JOHN G. DINNING,
Secretary.

ALEXANDER CLERK, Esq.,
Secretary Harbour Commisssioners.

LETTER OF INSTRUCTIONS TO THE BOARD OF ENGINEERS FOR THE PURPOSE OF CONSIDERING ON INCREASED ACCOMMODATION IN THE HARBOUR OF MONTREAL.

HARBOUR COMMISSIONERS' OFFICE,
Montreal, 9th Nov., 1857.

GENTLEMEN,—In order to obtain the fullest benefit from your advice on the important question submitted to you as to the best means of providing additional Harbour accommodation at this port, and, to give a direction to your investigations, the Harbour Commissioners would call your attention to the following points :—

1. As a preliminary,—Have the Commissioners, in your opinion, acted wisely in deepening Lake St. Peter, and otherwise improving the navigation between Montreal and Quebec. Or whether would it have been more advantageous to the Trade and Commerce of the Province not to have deepened Lake St. Peter, but to have allowed the interior vessel to proceed to Quebec, and there exchange cargoes with the ocean vessel? Should you be of opinion, on examination, that no adequate public advantage has resulted, or is likely to result, from improving the navigation below Montreal, so that vessels from sea drawing 20 feet may ascend at the lowest stage of water to this Port, it will then be a matter for your consideration and report, whether more extensive Harbour accommodation should be made at this point, or whether the necessary facilities should be provided at Quebec for the general trade of the interior.

2. The Commissioners have prosecuted the improvement of the navigation below Montreal, under the conviction that if a sailing vessel of 2000 or a steamer of 3000 tons could ascend from sea to this port without the necessity of lighterage, there to meet, at the foot of canal and inland navigation, the sailing or steam vessel of the interior, specially adapted to river and lake navigation, the cost of transport on imports and exports would thereby be reduced to a lower rate than if such inland vessels proceeded below this port, on a route which (by a comparatively small outlay) could be made available for the largest class of ocean steamers and sailing vessels. Your opinion on this point is requested.

3. Another consideration will present itself for your opinion before advising the Commissioners to proceed with any extensive improvements, namely, the magnitude of the trade of the interior and of the West, and whether it is possible to attract any large share of it to this port. The Commissioners desire to direct your attention to the fact, that although the magnificent canals on the St. Lawrence are in perfect order, and have been in operation since 1849, with a system of railways also in operation for two years, running from Quebec, and connecting with all points south and west, yet, up to the close of 1856, the St. Lawrence route had only succeeded in attracting fifteen per cent. of the Western Canadian and Western United States trade, eighty-five per cent. of that trade passing through the Erie Canal and over the railways of the State of New York. Should you, upon examination find, that with the improvements now going forward on the Erie Canal, the route from the West *via* Buffalo and Oswego is likely to continue to be the best and cheapest to the Eastern States, New York, and Europe, then this opinion must guide you as to the extent of the works which you would propose for further Harbour accommodation.

4. The Harbour Commissioners have been of opinion, that the St. Lawrence route, as a means of transport between Europe, the Eastern States, Western Canada, and the Western States, has not yet been fully developed; that if the Welland Canal were enlarged, so as to admit the passage of vessels of 800 tons, and a Canal constructed to connect the St. Lawrence with Lake Champlain, and suitable facilities created in this port, so as to shorten the stay of the western and ocean vessel, and thus reduce the cost of insurance, storage, and price of handling property, to the lowest possible rates,—a vast increase of trade would thereby be attracted to the St. Lawrence, to the great advantage not only of this port, but to the general public interests. It will be found that a vessel from sea in the port of Montreal is 120 miles nearer to ports on the Lakes than are any of the seaports on this continent; while the distance from Chicago, or from any other Lake port, to Liverpool, is 480 miles less *via* Montreal than *via* the port of New York. To these points your attention is directed.

5. Should your investigations as to the merits of the several channels of trade between the Atlantic and the interior, result in your finding that the port of Montreal possesses superior advantages as a depôt for the transfer of cargo between the ocean and the upper Lake vessel, and that the St. Lawrence route may be made the cheapest to Great Britain and to other European countries, and also the best route to the Eastern States and to New York, then a large increase of Harbour accommodation becomes imperative, and the nature and site for the improvements in the Harbour will come next in order for your consideration and report, together with an estimate of the probable cost thereof.

6. On the question of site there has been much public discussion. It has been urged by some, that the improvements should be made in or near Hochelaga Bay; by others that docks could be constructed with advantage to the public at or near Viger Square; by others that a dock could be made by enclosing the present harbour; while another party recommends that the space between Windmill Point and Point St. Charles should be enclosed. On no one of these schemes have the Harbour Commissioners any opinion to offer. They desire to leave you at full liberty thoroughly to investigate and report on what seems to you best calculated to promote the general trade of the Province, believing that the true interests of this port will thereby be best secured.

7. The Commissioners would refer you to plans, prepared under their directions by their Engineer, Mr. Forsyth, showing the proposed improvements in Hochelaga

Bay, and at Point St. Charles; as well as to a report by their Chairman, Mr. Young, dated 23rd April, 1857, on the same subject; and also to a collection of various communications, which from time to time have appeared in the public prints in favor of particular localities as sites for such improvements.

Should any further information be required by you, the Commissioners will be ready to furnish the same, so far as they may have it in their power to do so.

JOHN YOUNG,
Chairman.
ALEX. CLERK,
Secretary.

To JOHN CHILDE,
W. J. MCALPINE,
JAS. P. KIRKWOOD, } Esquires, Engineers.

CHICAGO, March 24th, 1858.

Hon. JOHN YOUNG,
Chairman of the Board of
Harbour Commissioners of Montreal:

SIR,—Under your letter of instructions of the 9th of November last, (*a a*), the undersigned, together with their late associate, Captain John Childe, met at Montreal on the ninth day of Nov. last, and proceeded to examine the several sites proposed for an extension of the Harbour, and also of the works which have been in progress under direction of the Harbour Commissioners during the last four years for the improvement of the channel of the St. Lawrence below Montreal.

They also examined the River between Montreal and Quebec, and the system of lights and buoys which have been placed there by the Trinity Board and Harbour Commissioners of Montreal.

After making these personal examinations, and discussing the various subjects to which their attention was called by your letter of instructions, and deciding upon the general outline of the Report, the preparation of its different portions was allotted to each of the members of the Board.

An arduous portion of the examination was undertaken by Captain Childe, and was prosecuted with his usual zeal and earnestness until his last fatal illness.

The compilation of the labors of the other members of the Commission, and the final arrangement of the Report, was also assumed by Captain Childe; but his lamented death, in February last, prevented the completion of either of these duties.

His family have placed in our hands the voluminous notes and memoranda which he had with great industry prepared and collected; and we have incorporated his opinions, both written and verbal, as far as it was possible, in the following Report.

The undersigned have felt it necessary to make these explanations in apology for the delay in the final completion of the Report.

The result of their investigations on the several subjects stated in your letter of instructions are given, but not in all cases in the order mentioned.

In connection with this Report, they present various communications which they have received from mercantile gentlemen, and from the Trinity Board of Quebec, on several subjects which they have had under consideration.

They also present the Estimates and Plans of the proposed Harbour at Montreal, prepared by your Engineer, Mr. Forsyth.

We take pleasure in alluding to the professional skill and ability displayed by Mr. Forsyth in the preparation of these plans and estimates, and in his courtesy in furnishing us with every aid in his power to enable us to examine and readily understand the plans and projects brought before us.

Respectfully submitted,
WM. J. McALPINE,
JAMES P. KIRKWOOD.

REPORT.

A glance at the map of North America will show nearly at its geographical centre a plateau from which navigable streams flow into the ocean to the North, South, and East. (*a*)

This plateau, scarcely two thousand feet above the level of the sea, is approached from the south by the Mississippi River, which forms a natural navigation for two thousand miles, to the Gulf of Mexico; from the east by the St. Lawrence and chain of lakes, giving a natural navigation to the Atlantic for a distance of two thousand five hundred miles; and from the north by the rivers Saskatchawan, Red, and Severn, which have a natural though not continuous navigation for more than one thousand miles, to Hudson's Bay. (*b*)

The territory lying to the east and south of this remarkable plateau, in the salubrity of its climate, in the fertility of its soil, in its varied productions, and in its extent and ready access to the great markets of the world, combines advantages superior to those of any other portion of the globe.

Its discovery, settlement, and development, have followed each other so rapidly, that its history must almost be written annually to give any correct statement of its present condition, or to furnish the basis of an estimate of its future importance and influence upon the trade and commerce of the world. (*d*)

The district to which this reference has been made embraces seven of the North-western United States and Canada West. (*e*) It contains nearly four hundred thousand square miles of land susceptible of the highest degree of cultivation, and is now occupied by eight millions and a half of people. To the north of this district there is a large area of sparsely-settled country. The portion which lies within the drainage of the Saskatchawan and Red Rivers possesses a climate and soil analagous to the southern water-shed of the Baltic.

To the west is another large area of land watered by the upper Missouri, and of equal fertility to that lying along the upper Mississippi, into which settlements have already been rapidly and extensively made.

The latitude of the north shore of Lake Superior corresponds with the south of England, and passes through central Europe

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(*a a*) See Appendix, note A A.

(*a*) See Map in the Appendix.
(*b*) See Appendix, note B.
(*d*) See Appendix, note D.
(*e*) See Appendix, note E.

and Asia; but its isothermal line, which passes through Sweden, Norway, Central Asia, and China, takes a north-western direction from Lake Superior, and in the valley of the Saskatchawan is removed fourteen degrees of latitude to the north. The Isothermal line of this valley for the summer corresponds with that of France and Central Europe. The mild climate which is thus indicated, ripens corn and wheat, and renders it a desirable district for the large emigration which has been recently arriving on this continent from the North of Europe.

These great districts, in connection with that portion of the continent lying to the eastward, contain within themselves all of the elements for the support of the most prosperous nation on the globe. The forests contain the finest timber, the earth the most valuable minerals, and the soil produces the largest crops of the most valuable cereals.

The natural advantages of this interior district, situated at from one to two thousand miles from the ocean, would have been almost valueless except for the magnificent water-lines which surround and penetrate it, and furnish so cheap a transport for the immense commerce which has grown up between it and the great markets of the world.

Half a century ago this region contained only straggling forts and trading posts, and now it contains nearly one third of the population north of the Gulf of Mexico.

Immigration from the Eastern States and from the Old World has poured into it like those earlier living streams that flowed from the North over Southern Europe, but unlike them it has been a flood of civilization over solitudes and barbarism.

Its future none may predict; but judging from the past, it will year by year assume more importance, and will warrant the largest expenditures to accommodate the vast trade which it will furnish to its outlet-channels of commerce.

For this trade as it now exists, the most costly works have been constructed to secure its advantages, to each of the great north-eastern Atlantic cities.

The Canadas have improved the St. Lawrence by a series of magnificent canals round the rapids of that river, and by a canal to connect Lakes Ontario and Erie; New York has spanned the portage between the Hudson and the Lakes by canals of great length; Pennsylvania has connected the Atlantic with the Ohio River by a canal carried over the Alleghany Mountains; Maryland and Virginia have expended large sums in extending their canals, projected across the same barrier; while individual enterprise has extended railways from the Atlantic almost to the extremity of the North-west through Canada, New England, New York, Pennsylvania, and Maryland.

In these works there has been expended, eastward of the district of which we are treating, more than four hundred millions of dollars, and an equal sum within it, to connect the interior with the land and water lines which form its outlet-channels of trade. (*f*)

The value of the commerce of the Lakes in 1855 was ascertained to be more than six hundred millions of dollars, and at this time it may be taken at seven hundred millions. The value of the commerce of the New York canals is two hundred millions of dollars; of the St. Lawrence is one hundred millions; and of the five trunk-lines of railroads is probably equal to three hundred millions.

The value of the vessels employed on the Lakes is fifteen millions of dollars, and those employed in this trade on the canals and rivers east of the Lakes are valued at an equal sum. (*h*)

A statement of the leading features and amount of the business done at the most important Lake ports in 1856 and 1857 will be found in the notes attached to this Report. (*i*)

The two natural outlet-channels for the trade of the North-west are the Mississippi and the St. Lawrence Rivers.

The Ohio River, which runs along the southern border of this territory, is navigable for one thousand miles, to its junction with the Mississippi. Around the falls at Louisville, a canal has been built which is used in low water, and which allows the passage of vessels of three hundred and fifty tons.

The Mississippi, the upper portion of which runs along the western border of the territory, is navigable from the Falls of St. Anthony for two thousand and forty-nine miles, to the Gulf of Mexico. At the head of navigation it has an elevation of eight hundred and fifty feet above the sea, and has an average fall of five inches per mile. The Rock Island and Des Moine rapids are navigable except in low stages of water.

The great chain of Lakes, which run through the northern portions of the territory, connects with the River and Gulf of St. Lawrence, and gives a continuous navigation for two thousand five hundred miles, to the ocean.

Lake Superior is six hundred feet above the level of the sea, and is twenty-seven feet above the level of Lakes Huron and Michigan. At the outlet of Lake Superior there is a canal one mile in length, and it has two locks which will pass vessels of two thousand tons. The Niagara River between Lakes Erie and Ontario has a fall of two hundred and seventy feet. The Welland Canal which connects the navigation between these Lakes is twenty-eight miles long, with twenty-seven locks which will pass vessels of four hundred tons. The St. Lawrence River from the east end of Lake Ontario to Montreal has a fall of two hundred and twenty feet, which is overcome by seven short canals of an aggregate length of forty-seven miles, with twenty-seven locks which will pass vessels of eight hundred tons.

The Channel of the St. Lawrence has been deepened so that sea-going vessels drawing eighteen feet at the lowest stage of water come up the river as high as Montreal, and operations are now in progress by which a channel of twenty feet will be given.

All of these works excepting that at the outlet of Lake Superior have been constructed by the Canadian Government.

The State of New York has built a canal from Buffalo on Lake Erie, and from Oswego on Lake Ontario, to Albany on the Hudson River, a combined length of five hundred and sixty-nine miles, with locks which allow the passage of boats of two hundred and fifty tons.[*]

She has also constructed a canal sixty-five miles long from the Hudson River to Lake Champlain, with locks which will pass boats of eighty tons; and from the northern and of Lake Champlain the Canadian Government has constructed a canal twelve miles long and locks in the Richelieu River, which will allow vessels of three hundred tons to pass between the St. Lawrence and Lake Champlain.

The State of Pennsylvania has constructed a canal from Chesapeake Bay, for three hundred and fifty-four miles (including thirty-seven miles of railroad) to the Ohio River, with locks which will pass vessels of sixty tons.

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[*] These canals were originally built with locks which allowed the passage of boats of sixty tons; the locks are now enlarged to the size above stated, and the enlarged channel-way is nearly completed. The dimensions of the boats are those which the canal will pass when fully completed.

The States of Maryland and Virginia have constructed canals from tide-water to the eastern base of the Allegheny Mountains, but have not yet extended them to the Ohio River, as originally projected.

The State of Ohio has constructed six hundred and forty-six miles of canal of the same size as the New York canals, to connect the Ohio River with Lake Erie in three places.

The State of Indiana has constructed four hundred and sixty nine miles of canals of the same size and for the same purpose as the Ohio canals.

The State of Illinois has constructed a canal of one hundred and two miles long, with locks which will allow the passage of boats of one hundred and fifty tons between Lake Michigan and the Illinois and Mississippi Rivers.

The State of Wisconsin has constructed canals and a slack-water navigation, which will allow vessels of three hundred tons to pass from Lake Michigan and Greenbay to the Wisconsin and Mississippi Rivers.

The trunk lines of railways have been constructed by individual enterprise, assisted in some cases by the Government.

The first of these trunk lines extends from a point one hundred and forty miles below Quebec, and from Portland, through both Eastern and Western Canada to the State of Michigan.

The second extends from Boston to Montreal and the eastern end of Lake Ontario, and to Albany, where it connects with the Central line through the State of New York.

The third extends by two lines from the City of New York to Lake Erie, where it is connected with the Canadian line leading westward, and by another line along the southern shore of Lake Erie, to Chicago, branching off to Cincinnati on the Ohio and St. Louis on the Mississippi.

The fourth extends from Philadelphia to the Ohio River, and thence to Cincinnati, St. Louis, and Chicago, connecting with the third line at Cleveland on Lake Erie.

The fifth extends from Baltimore to the Ohio River, and thence to Cincinnati, where it connects with the other lines leading westward.

The first line is also extended across the State of Michigan by two roads, one leading to Grand Haven on Lake Michigan and the other to Chicago.

From Chicago seven lines of Railways have been opened to the Mississippi at Cairo, St. Louis, Alton, Quincy, Burlington, Rock Island, Fulton, Dubuque, and Prairie du Chien, and two lines northward, to Fond-du-Lac and Milwaukie.

From each of these main trunk lines, others radiate in every direction, reticulating almost every part of the territory in question. Some of these might also be included among the trunk lines, while others are but tributaries to the main lines which have been above noted.

This territory of the Northwest, as thus described, has within itself a natural navigation of eight thousand miles, an artificial water navigation of one thousand miles, and eight thousand miles of railway in operation, besides a thousand miles more in progress.

From the preceding sketch, it will be seen that the territory in question has two natural and two artificial water lines leading to the ocean, besides five great trunk railways extending to the Atlantic seaboard.

The ocean ports at the termini of the two natural water-lines are Montreal and New Orleans, and those at the termini of the two artificial water-lines are New York and Philadelphia.

The ocean ports at the termini of the trunk railways are Quebec, Portland, Boston, New York, Philadelphia, and Baltimore. (k).

The relative value of the several lines for the transport of the trade and commerce between the territory and the Atlantic will now be examined.

The Ohio and Mississippi Rivers have a current of from one to three miles an hour in the direction of the greatest movement of the tonnage. These rivers are broad and very shallow in ordinary low water, obstructed by sandbars, and by snags on the lower half of the voyage. The channels are tortuous and in some places very changeable, and can only be navigated by steamboats of a peculiar character, having small draft of water and propelled by powerful machinery which must be made as light as possible and cannot therefore be adapted to the economical use of fuel.

The cost of transport by this route is therefore more expensive than it would be, considered without reference to the peculiarities of the navigation and of the vessels employed. (*l*)

At New Orleans (the ocean terminus) there is a limited demand for the agricultural productions of the upper portion of these rivers, the country adjacent to the lower portion being nearly sufficient to furnish the requisite supply of these articles.

The vessels from that port have large export cargoes of the productions of the lower country and a very limited amount of return freight, and have an increased length of voyage to reach European ports compared with those sailing from the north-eastern Atlantic ports.

The climate of the lower country injuriously affects most of the products of the northwest, and diminishes their value when shipped by that route.

The expense of transferring cargo at New Orleans is much greater than at the northeast. All of these circumstances combine to the prejudice of this route, and confine the exports by it, from the territory in question, to a narrow belt along the Ohio and along the upper Mississippi between Cairo and the Des Moines Rapids.

The canals of Pennsylvania drain but a small area along the upper Ohio, in consequence of their limited size, great lockage, and disconnected water-lines.

The determination of the question of the best route for the water-borne trade is therefore reduced to a comparison between the routes through the State of New York and that along the St. Lawrence.

For the present purpose each of these routes will be examined as if they had already been improved and completed upon the most advantageous plans, which the anticipated extent of the trade through them would warrant (*m*.)

With this view the cost of transport on the Erie and Oswego canals will be taken, as if they were enlarged throughout. The Caughnawaga canal, from the St. Lawrence to Lake Champlain, will be considered as completed on the same scale as the St. Lawrence Canals; and the Champlain Canal will be regarded as also enlarged to the same dimensions.

(k) See Appendix note K.

(*l*) See Appendix note L.

(*m*) See Appendix note M.

The locks on the Welland Canal will be considered as enlarged to the same capacity as those on the St. Lawrence Canals; and the St. Lawrence River between Montreal and Quebec will be regarded as improved so as to allow sea-going vessels of a capacity for twenty feet of water-draft, to meet the lake craft side by side in a safe and commodious harbour at the former port.

It has been ascertained that the tonnage of the exports* from an agricultural district is four times as great as the tonnage of its imports, when they are of equal value.

The surplusses of the territory in question are mostly raw and heavy commodities, embracing the cereals and lumber, and a small amount (relatively) of flour and salted meats; and in return for these articles of export are demanded the manufactures and merchandise from the East, and groceries from the East and South; while the prairie country of the south-western portion of the territory requires also large supplies of lumber from the northern and north-eastern portions of the district (*n*.)

The raw commodities, and those of considerable bulk or weight in proportion to their value, must necessarily be transported by the cheapest conveyance, almost irrespective of the rapidity of movement.

These classes include by far the largest amount of tonnage moved.

Next in importance are the bulky and heavy articles of manufactures, merchandise and groceries, when cheapness of transport is important, but where greater celerity and certainty of movement are required than in the first-mentioned class.

Articles of great value in proportion to their bulk or weight, and those of a perishable character, require the more speedy transport, almost without regard to the cost of conveyance.

Sailing vessels furnish the cheapest transport, and are chiefly employed in the conveyance of the first class; steamboats and propellers are required for the second class; and the railways enjoy the monopoly of the last of the classes above mentioned.

Some of the articles embraced in these classes are conveyed exclusively by sail-vessels, some by steam-vessels, and some by the railways; but for many others there is a strong competition between the different modes of transport, the more rapid but expensive ones drawing to themselves the conveyance of articles which belong to the cheaper modes of transport. (*o*)

The lateness of the season, the demand for or value of the article in market, or the necessities of the owner, frequently change the movement from a slower to a more speedy conveyance.

During the last ten years important changes have taken place, which modify to a considerable extent the conclusions which were arrived at by those who have examined the cost of transport at an earlier day than the present.

The demands of trade in its infancy required only the smallest class of vessels; as it increased, the demand was at first met by an increased *number* of vessels, which, for the convenience of the architect, was confined to the same model and size. When the trade upon any particular route became important, vessels of improved models and increased size were introduced. The prejudices of navigators were for a long period opposed to any considerable increase in the size of vessels; but the large increase of the mercantile navy of the last quarter of a century has year by year led to the substitution of ships of increased size. (*p*)

The packet-ships from the port of New York have been enlarged from two hundred and fifty to fifteen hundred tons, and steamers of two to three thousand tons are now in common use upon the ocean.

The limited trade of the lakes was accommodated at first by a small class of vessels. This trade has increased with great rapidity, and, wherever it has become of sufficient importance to warrant the use of large vessels, they have been supplied; so that at this time a considerable portion of this trade is done in vessels of from two to five times the size of those employed a few years since.

It has been found that the cost of building, equipping, and running the larger vessels does not increase in the same proportion as the increase in their capacity; and therefore that the cost of transport is reduced by increasing the size of the vessel, whenever there is a sufficient amount of trade to insure full cargoes.

The best-informed navigators upon the Lakes estimate the cost of transport in the largest class of vessels now employed at one-fourth less than in the small vessels which were formerly exclusively employed in the lake trade.

The increasing demands of trade and the competition of the railways have called into use a class of steam-vessels denominated propellers, of great carrying capacity, and with engines adapted to a slow speed, so as to obtain the greatest economy of fuel.

Those of this class first built were small vessels, but it was soon ascertained that the greatest economy was attained by enlarging them to the greatest size that the lake harbours would admit.

The economy with which these vessels are run, combined with the greater celerity and certainty of their voyages, enables them to share with sailing vessels the carriage of the bulky and cheap articles going towards tide-water; and as their charges are so much lower than those of the railway, and their deliveries are as prompt and but little longer, they have rapidly drawn to themselves a larger portion of the business which had begun to seek the latter; and thus, by generally securing full cargoes in both directions, they have effected a material reduction in the charges of freight both ways.

The grain trade of the Lakes *now* requires the handling of a million of tons per annum at each end of the route, and at each transfer of cargo. At the principal shipping ports on the Lakes warehouses of great capacity have been erected, into which the grain is elevated by steam power from cars or waggons, weighed and held in store, and loaded into vessels, at less than one-fourth the cost of the former hand method. (*q*)

The vessel being loaded in much less time, her port expenses are very much reduced, which again results in diminishing the cost of transport.

Similar arrangements will doubtless soon be brought into use for the transferring of other freight, which, with the continued improvements yearly made in every branch of transport, will prove an additional stimulant to this trade, already so large.

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* By the word "exports," as used in this place, is to be understood the surplus not required for consumption within the district.

(*n*) See Appendix note N.

(*o*) See Appendix, note O.

(*p*) See Appendix note P.

(*q*) See Appendix note Q.

In comparing the routes through the State of New York with each other and with the St. Lawrence, it is necessary to observe, that by the way of Buffalo and Oswego a transhipment must be made from the lake vessels to canal boats, and that the extra cost of canal transport and heavy tolls must be added to these routes; while by the way of Lake Champlain to New York, and by the St. Lawrence to Montreal, no transhipment is required, and the extra cost of the movement on the canal and of tolls is very much reduced.

The cost of transport by all these routes except that by the way of Buffalo will be greatly reduced by the enlargement of the locks of the Welland Canal.

These locks enlarged to the same size as those on the St Lawrence Canals (with some additional length), and those on the St. Lawrence also lengthened, would allow the use of vessels of eight hundred and fifty tons, which is probably as large as could enter the Lake harbours.

The advantage of the use of such large vessels, making such long voyages will reduce the cost of transport by the other three routes so much less than that by the way of Buffalo, so as to divert a large portion of the Western trade from that port, through the Welland Canal, and the other route to New York and Montreal.

The cost of the new locks on the Welland Canal and of some improvements in the channel is estimated at two millions one hundred and fifty thousand dollars. (*r*)

It is believed that the increased business which would be diverted through it, together with the natural increase of the trade would warrant the construction of these enlarged locks at as early a day as they could be built.

From the computations which follow, it will be seen that the cost of transport to New York by the way of the proposed Caughnawaga and enlarged Champlain Canals in ordinary vessels is less than by the way of Oswego.

The Champlain route thus improved will have the further advantage of the more economic use of vessels of the largest class proceeding from any port on the Lakes directly to New York, without breaking bulk, and also the diminished length of canal navigation by that route.

The construction of the Caughnawaga Canal will enable such vessels to land and receive cargo at Burlington and Whitehall, from whence Western freights can be carried to and from Boston by railways cheaper than by any other railroad route to that city.

This canal would thus open a considerable portion of Western New England to this route, and add very largely to the revenues of the Welland and the St. Lawrence Canals, and also give value to the railroads of Western New England which terminate on Lake Champlain, and those connected with such roads, many of which are now unproductive.

The Caughnawaga Canal built, the state of New York would not long hesitate in the enlargement of the Champlain Canal so as to allow the largest lake craft to come directly to her seaport.

The route by St. Lawrence to Montreal requires to be next noticed.

It will possess advantages equal to all those which have been mentioned in any of the other routes named, in the improvements in navigation, the increase in the size of vessels, in their improved models, in the facilities for loading and discharging cargoes at both ends of the routes, in the length of voyages without transhipment, in having the least distance between any of the lake ports and the seaport, and in having the shortest length of taxed canal navigation.

When this route has been improved in the manner already suggested (the details of which will be subsequently discussed), there can be no question but it will draw enough of the Western trade to amply repay the cost of the works which have been proposed.

In addition to the advantages which have been already stated, in each of which it shares equally with all the other routes, it possesses a water-power located at its eastern extremity which may be considered of unlimited capacity.

The value of a water-power thus located will be appreciated when it is considered that throughout the whole grain-growing region of the west, there is almost none, certainly no amount of water-power at all adequate to the manufacture of the immense quantity of the cereals which must be exported from that region.

The value of such a power is enhanced by being located in close contiguity to the dense population along the Atlantic, where the offal has the greatest value, and it is also increased because it can be directly reached by lake craft without transhipment or drayage.

The whole available power at Black Rock, Lockport, Rochester and Oswego has been already occupied. (*s*)

These places are at a great distance from the seaboard. At Black Rock and Oswego the lake vessels can discharge grain into the flouring-mills, and the manufactured flour can be loaded directly from the mills into canal-boats. At the other places named, grain to be floured must be subjected to an extra transhipment, the cost of canal transport, and in many cases to an expensive drayage.

The plan of the contemplated harbour at Montreal provides for a large water-power, with the means of increasing it almost without limit, and so located that lake vessels may discharge their cargoes of grain designed for manufacture lying alongside the flouring-mills, and the grain so manufactured can be delivered on board of the ocean ship or steamer as well as on cars for direct transport to the East without drayage. (*t*)

The rapid growth of the trade at Oswego will best serve to illustrate the advantages which would be enjoyed at Montreal by the construction of the proposed works. The present condition of the trade at Oswego is not alone due to the cheapness of the greater length of untaxed lake navigation which it enjoys, but to that cause combined with the advantage of receiving and manufacturing grain without the expense of transhipment or cartage. (*u*)

At the port of New York there is no water-power, and Western grain designed for export from that port is subjected to the expenses of transhipment at the place where it is manufactured, or to the extra cost of the transport of the raw material on the ocean.

These expenses will be obviated by the consignment of grain to Montreal, and it will there have another advantage in the better condition in which flour will be shipped, as the barrels will not

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(*r*) See Appendix, note R.

(*s*) See Appendix, notes S. T. U.

be liable to any damage or loss in the movement or in the exposure to the weather. This cannot be assumed at less than twenty-five cents per barrel, or five per cent on the cost of the article.

A considerable portion of the surplus of the West is required for consumption in the manufacturing districts of New England and at the fisheries at the outlet of the St. Lawrence.(*v*)

The interior of New England can be supplied from Montreal cheaper than from any other direction, and the monopoly of this trade may be counted upon as belonging to this route.

The supply to the fisheries can also be obtained through this route as cheap as by any other.

The British Government, by an enlightened policy, has thrown open the navigation of the St. Lawrence free to all nations, and the products of the Western States may be exchanged at Montreal for the products of any other country free from any duty to the English Government. The cheapness, shortness, and other advantages of this route, when fully appreciated, will doubtless attract to it so considerable a share of the Western trade as to warrant the expenditures proposed for the enlargement of the locks of the Welland canal and for the proposed harbour improvement at Montreal.

The following table of the cost of transport per ton by the several routes is made up from Chicago, as a starting-point common to all, from which vessels of eight hundred tons will perform the duty as far eastward as they can be navigated on each route. (*w*)

The routes through the Erie canal, both by the way of Buffalo and of Oswego, will require the voyage of the large vessels to terminate at those ports, and the cargo to be transferred into canal-boats of two hundred and fifty tons.

The route through Lake Champlain to New York, and that through the St. Lawrence to Montreal, will allow the large vessels to proceed directly to those ports without transfer of cargo.

TABLE.

First.—From Chicago to New York by the way of the Lake to Buffalo, the Erie canal, and the Hudson River to New York.

	By sailing Vessels.	By steam Vessels.
From Chicago to Buffalo, 914 miles Lake navigation, at 2 and 3½ mills	$1.83	$3.20
" Buffalo to West Troy, 353 " Canal " at 8 mills	2.82	2.82
" West Troy to New York, 151 " River " at 3 and 5 mills	0·45	0·76
Transferring cargo at Buffalo	0·20	0·20
1418 miles	$5.30	$6.98

Second.—From Chicago to New York by the way of the Lakes and Welland canal to Oswego, and thence by the Oswego and Erie canals and the Hudson River to New York.

	By sail vessels.	By steam vessels.
From Chicago to Oswego, 1057 miles Lake navigation, 2 and 3½ mills	$2.11	$3.70
Additional expense on the Welland canal, 28 miles, 3 mills	0·8	0·8
From Oswego to West Troy, 202 miles Canal navigation, 8 mills	1.62	1.62
From West Troy to New York, 151 miles river navigation, 3 and 5 mills	0·45	0·76
Transferring cargo at Oswego	0·20	0·20
1410 miles	$4.46	$6.36

Third.—From Chicago to New York by the way of the Lakes, the Welland, St. Lawrence, Caughnawaga and Champlain canals and the Hudson River to New York.

	By sail vessels.	By steam vessels.
From Chicago to New York, 1632 miles, at 2 and 3½ mills.	$3.26	$5.71
Additional expenses on the Welland, St. Lawrence, Caughnawaga and Champlain canals, 167 miles, 3 mills	0·50	0·50
1632 miles	$3.76	$6.21

Fourth.—From Chicago to Montreal by way of the Lakes and River St. Lawrence and the Welland and St. Lawrence canals.

	By sail vessels.	By steam vessels.
From Chicago to Montreal, 1278 miles, at 2 and 3½ mills.	$2.50	$4.47
Additional expense in the St. Lawrence and Welland canals, 75 miles, at 3 mills	0·22	0·22
1278 miles	$2.78	$4.69

The comparison of the routes by Railroad from the termination of the voyages of the large vessels to certain points is as follows:

First.—From Chicago to Buffalo by Lake vessels, and thence to New York by Railroad.

	By sail vessels.	By steam vessels.
From Chicago to Buffalo, 914 miles, as before	$1.83	$3.20
" Buffalo to New York, 444 " Railroad, at 1½ cts.	6.66	6.66
Transferring cargo at Buffalo	0·20	0·20
1358 miles	$8.69	$10.06

Second.—From Chicago to Oswego by Lake vessels, and thence to New York by Railroad.

	By sail vessels.	By steam vessels.
From Chicago to Oswego, 1057 miles, as before	$2.19	$3.78
" Oswego to New York, 327 " by Railroad, at 1½ c.	4.90	4.90
Transferring cargo at Oswego	0·20	0·20
1384 miles	$7.29	$8.88

Third.—From Chicago to Whitehall by Lake vessels, and thence to New York by Railroad.

	By sail vessels.	By steam vessels.
From Chicago to Whitehall, 1415 miles, at 2 and 3½ mills.	$2.83	$4.95
Additional expense of Welland, St. Lawrence, and Caughnawaga canals, 101 miles, at 3 mills	0·30	0·30
From Whitehall to New York, 223 miles, by Railroad, at 1½ cents	3.35	3.35
Transferring cargo at Whitehall	0·20	0·20
1638 miles	$6.68	$8.80

Fourth.—From Chicago to Whitehall by Lake vessels, and thence to Boston by Railroad.

	By sail vessels.	By steam vessels.
From Chicago to Whitehall, 1415 miles, and transferring cargo as in No. 3	$3.33	$5.45
" Whitehall to Boston, 191 " by Railroad, 1½ c.	2.87	2.87
1606 miles	$6.20	$8.32

Fifth.—From Chicago to Burlington by Lake vessels, and thence to Boston by Railroad.

(*v*) See Appendix, note V.

[*w*] See Appendix, note W.

	By sail vessels.	By steam vessels.
From Chicago to Burlington, 1351 miles, at 2 and 3½ mills	$2.70	$4.73
Additional expenses of Welland, St. Lawrence, and Caughnawaga canals, 101 miles, at 3 mills.	0·30	0·30
From Burlington to Boston, 258 miles, at 1½ cents......	3.87	3.87
Transferring cargo at Burlington..............	0·20	0·20
1609 miles............................	$7.07	$9.10

Sixth.—From Chicago to Montreal by Lake vessels, and thence to Boston by Railroad.

	By sail vessels.	By steam vessels.
From Chicago to Montreal, 1278 miles, as before........	$2.78	$4.69
" Montreal to Boston, 341 " by R. road, 1½ cts.	5.12	5.12
Transferring cargo at Montreal................	0·20	0·20
1619 miles............................	$8.10	$10.01

Seventh.—From Chicago to Montreal by Lake vessels and thence to Portland by Railroad.

	By sail vessels.	By steam vessels.
From Chicago to Montreal, as before, 1278 miles.......	$2.78	$4.69
" Montreal to Portland by RR., 292 " at 1½ cts..	4.38	4.38
Transferring cargo at Montreal................	0·20	0·20
1570 miles............................	$7.36	$9.27

It is obviously impossible to incorporate in such estimates all of the incidental advantages of some of the routes to which allusions have been made; but as these would not affect the general conclusions which are derived from the tables, a more particular consideration of them is not deemed necessary.

These tables of the cost of transport, as has been already mentioned, do not show the present charges by the several routes, but are only intended to exhibit the comparative cost of each route when they have been fully improved in the manner which has been previously stated.

The present charges for transport between the West and the Atlantic are more in favor of the routes to New York than the above tables would indicate; but any conclusions drawn from the present conditions would be obviously of only temporary application. (*a*)

Having brought the cost of transport from the interior to Montreal, the next point for consideration is as to the expediency of continuing the lake vessel to Quebec, or of bringing the sea-going vessel to Montreal. Our late associate, Mr. Childe, had fully examined this question, and we quote from his notes as follow:—

"It has been already shown that the shortest and cheapest route from Chicago to tide-water is viâ the St. Lawrence, and it is admitted by all commercial men that unobstructed transport trade will always take the shortest and cheapest route. As a question of practical economy, it must also be admitted, without the necessity of argument, that vessels properly constructed for the lake and river traffic west of Montreal, will be neither safe nor profitable for the gulf and ocean; nor, on the other hand, would the deeper build of sea-going vessels be suitable for the canals and shallow parts of the river and lakes. It follows, then, that a port of transhipment must be provided. The natural course of Canadian trade and population has from an early period made Quebec and Montreal prominent centres of both upon the river. These cities divide the river trade, and are together capable of affording all the facilities that the future commerce of the river may require. The differences peculiar to each seem to spring solely from natural causes, to wit: at Quebec the river harbour is deep and broad, the channel from thence to the ocean has always been unobstructed and sufficient for the largest class of vessels. The changes of tidal level (13 and 18 feet respectively for summer and spring) would be detrimental to general traffic, but are of very great advantage in the landing, preparation, and shipment of timber, which is chiefly transported in rafts from the upper country to Quebec. For such reasons the immense timber and lumber trade of the provinces will doubtless continue to be transacted at Quebec.

"Quebec and Montreal must enjoy a very large increase of general traffic by the increase of population in their respective districts, and also by all public works which serve to expedite and chepen the collection, transportation, and distribution of produce and merchandize whether inward or outward bound via the St. Lawrence route.

"It is apparent that the position of Montreal, at the head of ocean navigation and at the foot of the lowest rapids, possesses certain advantages peculiar to itself. It is surrounded by a more populous and fertile region of country, at the confluence of the St. Lawrence, Ottawa, and Lake Champlain routes of trade, and the focus towards which the continuous influences of railways and the natural and artificial water-channels of the West and North-west will more and more concentrate the trade of the lake countries. These countries now number eight millions of people: at the close of another century they will probably come up to twenty millions.

"We notice also, as a proof of the eligible commercial position of Montreal, that in the years preceeding 1856, during which the corn laws of England and all differential duties favoring the direct export and import trade with the Canadas had been repealed, and the bonding system of the United States and the reciprocity treaty with that country established, the ports of the United States became virtually *free* to Canadian trade, thereby diverting from the St. Lawrence route $\frac{13}{16}$ of the Canadian cereal exports and $\frac{5}{8}$ of all imports. Yet the imports into Montreal increased at the same time fifty per cent, but $\frac{11}{16}$ of this increase appears to have accrued on the first year of the reciprocity trade with the United States."

"In 1855 the total imports by the river are stated at..............................	$11,494,028
Total imports from United State ports........	20,825,432
Making total imports......................	$32,319,460

of which Montreal absorbed $12,372,580, or over $\frac{3}{8}$ of the whole; and $878,552 more than the total imports that year by the river.

Thus showing Montreal to be largely on the increase, notwithstanding the diversion of the trade from the river to other routes, via Portland, Boston and New York. (*b*)

"But the true interests of Canada, and of the North-western Lake States, requires that that trade and its future increase shall be restored to the shorter and cheaper route via the St. Lawrence, not by restrictive governmental enactments, but by perfected canals, deepened channels, numerous light-houses and well instructed pilots.

(*a*) See Appendix, note A.

(*b*) See appendix note B.

"Other local considerations point to Montreal as the sea-port of the West, and as the proper point of transhipment between sea-going and interior lake vessels.

"1st. Because the larger sea-going vessels can continue their voyage from Quebec to Montreal, one hundred and eighty miles, at less cost per ton than would attend running the smaller interior vessels from Montreal to Quebec; for with the completed twenty feet channel, and corresponding harbour extension at Montreal, there is no reason to apprehend extra risk or detention.

"For instance, a steamer of medium size arrives at Quebec fully loaded with 1200 tons of goods, 250 for Quebec and 950 for Montreal and the West, with an average of 100 passengers. After discharging the Quebec freights, her actual expenses to Montreal and back will be as follows, exclusive of lake dues, which ought to be rescinded on the completion of the new channel, if not before:

Pilotage up and down,……	$107
Wharfage at Montreal 12 days,……	100
Coals consumed, average 70 tons ($280)……	280
Sums expended in running up and down and mooring at wharves two days, for which the pay and subsistence of officers and men will be……	140
Interest and insurance (2 days) on cost of ship,……	128
Total disbursements Quebec to Montreal and back,……	755
Add contingent expenses……	75
	$830

"If we count each passenger as equal in rate and measurement to two tons, and that the ships take at Montreal for cargo twenty five passengers and 1000 tons, the total movement up and down will be equivalent to 2200 tons, nett cost per ton 38¾ cents, which is 2¼ mills per ton per mile, or 3⅞ cents per barrel for flour from Montreal to Quebec. To perform this account of transportation by two medium-sized interior steamers fully loaded with 500 tons each, with passenger accommodations, will be as follows:

Pilotage for both, up and down……	$112
Wharfage at Quebec 5 days, ¼ ct……	50
Coal consumed 40 tons to each=80……	320
	$482

"Prominent merchants largely engaged in the forwarding business between the upper lakes and the ports of Montreal and Quebec, object to sending their steamers to Quebec on account of detentions from the want of suitable wharf space, from the tidal changes, and from the risk of grounding at low water at the wharves; but these evils can be obviated in time by building more wharves and extending them to deeper water, and by a tidal dock for which there exists an admirable site at the mouth of the creek on the north-westerly side of that city. But apart from all local questions, the general accumulation of export products at Montreal, as the terminus of 1500 miles of inland navigation, is much better security against detention of vessels there either for loading or discharging, than can be had at Quebec at any time. We therefore make allowance of one day for each trip in favor of Montreal, and state:

Previous amount brought forward……	$482
Three days time in running and mooring at wharves and other detentions, for which the pay and subsistence of officers and men will be……	215
Interest and insurance 3 days on cost……	192
For contingent expenses $50 each……	100
Total by inland steamers……	$989

"Which divided by 2200 tons, as before, gives 45 cents per ton=$2\frac{9}{10}$ mills per ton per mile and 4½ cents per barrel of flour. The above shows the comparison between sea-going steamships of 1200 tons and lake vessels of 500 tons. Steamships of 2400 tons are now built for this route, the cost of transport by which, compared with the largest lake craft (800 tons). would show a still larger result in favor of bringing the ocean steamships to Montreal.

The same comparison of sea-going and inland sailing vessel shews a much larger difference in favor of sending ocean vessels to Montreal." (*ci*)

It is evident, as stated by Captain Childe, that there must be a transfer of cargo between the vessels which are employed in the interior trade and those which are employed upon the ocean, and we agree with the opinion expressed by him that this transfer can be made to the best advantage at Montreal.

As the estimates which have been before given of the cost of transport from the interior, brought the comparison to the two seaports of Montreal and New York, it is deemed proper to continue the comparison across the ocean and to the West Indies and South America.

It is true that there is but little general trade now existing between Canada and these Southern ports; but it is evident that the large supplies of lumber in its various forms which are now drawn from the United States to the West India islands, and to the Southern continent, can be supplied from the extensive forests of Canada East by direct shipment on more favorable terms than from the North-eastern ports of the United States, and, as the supplies of these articles at those ports are being rapidly exhausted, it cannot be long before resort must be had to the St. Lawrence for this article of commerce.

The wood exports of the United States to the West Indies and to the Southern continent in 1856 amounted to four and a half millions of dollars, being sixty per cent of the whole wood exports of the country. (*d'*)

The following tables show that the cost of transport from the St. Lawrence to these Southern ports does not exceed $1.50 per ton more than from Boston or New York, which, from the less cost of these wooden products at the former place, would enable the Canada merchants eventually to command the market.

Tables of the cost per ton by sailing vessels.

1st. From Montreal to,—

	HAVANA.		JAMAICA.		RIO JANIERO.	
	Distance miles.	Cost.	Distance miles.	Cost.	Distance miles.	Cost.
		$ cts.		$ cts.		$ cts.
At one mill per mile, add cost from Chicago to Montreal, as before……	2910	2 91	3095	3 10	6800	6 80
	1278	2 78	1278	2 78	1278	2 78
Total……	4188	5 69	4373	5 88	8078	9 58

2nd. From New York to,—

	HAVANA.		JAMAICA.		RIO JANIERO.	
	Distance miles.	Cost.	Distance miles.	Cost.	Distance miles.	Cost.
		$ cts.		$ cts.		$ cts.
At one mill per mile, add the cost from Chicago to New York, as before…	1290	1 29	1495	1 50	5210	5 21
	1410	4 46	1410	4 46	1410	4 46
Total……	2700	5 75	2905	5 96	6620	9 67

(*ci*) See Appendix, note Ci.

(*d'*) See Appendix, note D'.

The comparison of the distance and cost to Liverpool will be as follows. (*e*)

	Miles.	Cost.	
		By sail.	By steam.
1st. From Chicago to Montreal, as before..	1278	$2.78	$4.69
From Montreal to Liverpool by Straits of Belle Isle..........................	2682	2.68	5.36
Add for towage on St. Lawrence.........		.30	
	3960	$5.76	$10.05
		By sail.	By steam.
2nd. From Chicago to New York, as before.	1410	$4.46	$6.36
From New York to Liverpool............	2980	2.98	5.96
	4390	$7.44	$12.32
Difference in favor of the St. Lawrence route.	430	1.78	2.27

The cost of transport from the Western interior to European ports is shown by these calculations to be about twenty-five per cent cheaper by the St. Lawrence than by any other route. The ocean charges are however nearly twice as much now from Montreal as from New York. This difference is to a large extent accidental, and must gradually and rapidly decrease with the growth of the Canadian provinces. Various considerations, to which we will now allude, confirm this view.

The trade of the port of New York has been long well matured. For a great length of time no burthensome restrictions have existed to discourage her commerce. She has been to all the nations of the world a free port, and her position as regards the inland trade of the lake basins, which her canals have controlled since 1830, aided by a harbour of easy access, has made her familiarly known to the ships of all nations. Her connections with the interior are equally well developed, and a long experience has systematized her forwarding facilities and reduced the cost and charges of transportation from the interior to a minimum. Vessels coming to the port from sea are sure of a cargo of some kind home or coastwise to other ports. In the same way steam vessels and canal barges from the interior lakes and rivers, as well as coastwise, can always count on a return of freight more or less from that accumulation of foreign merchandise which is delivered at New York to meet the consumption of the Western States, of the State of New York, and of a considerable portion of the province of Canada. At the port of New York every facility, growing out of a long and large experience in both the interior and the ocean trade, is thus well understood. The port of Montreal, on the contrary, is thus far, very deficient in similar advantages. It is but nine years since the restrictive laws of Great Britain as regards foreign shipping entering the Gulf of the St. Lawrence were removed. Previous to that time no foreign vessel entered that port. The trade was entirely carried on in British bottoms, and was hampered with conditions which cramped and depressed it, increased the costs of foreign stuffs, and, so far as any commercial regulations can produce such effects, suppressed the commercial capabilities of the provinces and discouraged mercantile enterprise. This exclusion of all foreign vessels kept that large portion of the commercial marine, including all United States ships, ignorant of the navigation of the Gulf.

The entire absence of lights until very recently, gave to the Imperial policy a tendency to discourage a wide knowledge of its waters, and gave to the navigation a bad name which it was the interest of the few ships that monopolized its trade to increase. In 1851 there was not one light-house on the North Shore between Quebec and Belle Isle, a distance of eight hundred miles; add to this that the canal improvements on the St. Lawrence have been but recently completed, and that Montreal could not command an interior trade of any consequence until these were, not merely in regular operation, but well known to shippers on the lakes, and the resources and convenience of the port will be sufficiently understood. The Railway communication between Montreal and the interior has been open scarcely two years, while from New York it has been open from ten to fifteen years. Above Montreal the canals around the rapids are on a scale now to pass steam vessels of 800 tons burthen. The enlargement of the Welland Canal to the same capacity, and the construction of the Caughnawaga Canal will render the navigation from the lakes all that can be desired. Below Montreal the River has been deepened within the last four years from eleven feet of water on the bars to eighteen feet of water. Ten lights are now established between Quebec and the mouth of the Gulf, and others are about being constructed, rendering that navigation now comparatively safe. Steam-tugs, established by Government, are stationed at Quebec, and operate below that city, affording facilities equal to any other port to vessels navigating the Gulf waters.

These improvements are being sensibly felt at the ports of Montreal and Quebec. The number of foreign ships entering the St. Lawrence in 1857 was one hundred and seventeen. A fortnightly line of steamships (fifteen hundred ton ships) from Montreal to Liverpool is now successfully* in operation, and is tending fast to make the peculiar advantages of the place, as regards the lake trade, known and appreciated.

The necessary facilities for utilizing the St. Lawrence River are thus being rapidly furnished by Canadian enterprise, but it will take time to make them known, to concentrate capital upon them, to gather in all the available aids to the growth of the trade, and to establish those lines of transportation with the interior which are so essential to the certain, rapid, and economical movement of merchandise, and for preventing undue detention of goods at the shipping port.

As all these different facilities take shape, and the existing deficiences in these and other respects disappear, it is evident that the port of Montreal will assimilate to the economical position of the port of New York, and will be able more and more to control that portion of the inland commerce for which she is in position so favorably situated.

In further illustration of these remarks, we will here enter into some details. (*f*)

During the last six years the Government has been engaged in establishing a thorough system of lights through the Gulf of St. Lawrence, to which allusion has already been made. These, with a more thorough survey of the channels and a more intimate acquaintance with the route on the part of the Gulf pilots and navigators, have even now all but entirely removed the apprehensions which formerly existed as to the dangers of the route.

(*e*) See Appendix, note E.

* A weekly line of vessels of twenty-four hundred tons is to commence running in August next.

(*f*) See Appendix, note F

The Northern coast of Newfoundland, the Straits of Belle Isle, and the route along the coast of Labrador, through the Gulf of St. Lawrence, are certainly more free from those dense fogs which prevail on the Banks for one thousand miles of the passage, followed by vessels from the north of Europe, than the north-eastern coast of the United States, and the ports between New York and Cape Race. The steamers plying between Montreal and Liverpool uniformly take the passage referred to, through the Straits of Belle Isle, and, in proof of its general exemption from the fogs which prevail during certain months to the south and also of the shortness of this route, they make shorter passages than the Cunard or Collins steamers from Boston and New York to the same port. (*g*)

The undersigned have made careful enquiries of masters of vessels who have been for a long time engaged in the navigation below Quebec, a few of whom were well acquainted with the navigation through the Straits of Belle Isle, and from all of whom they have received the strongest assurances of the safe and convenient navigation to the open sea by that route, although hitherto it has not been much used except by the steamers aforesaid. (*h*)

The Straits of Belle Isle are more particularly alluded to on account of the shortness of that passage as compared with the route by Cape Race, which is better known and has been more usually taken by sailing vessels.

The River St. Lawrence between Quebec and Montreal has been well lighted and buoyed under the directions of the Trinity Board and Harbour Commissioners of Montreal. A particular examination of the efficiency of their system of lights was made by the undersigned in November last, under circumstances which gave them an opportunity of forming a correct opinion of its value; and they are thus enabled to say, from their own observation, that this portion of the River, as now improved and lighted, presents no difficulties to its safe and convenient navigation.

The more northern portion of the St. Lawrence route may lead to the assumption that it remains closed by ice later than the New York routes. But such is not the fact. The great body of water passing down the St. Lawrence, and its derivation from the upper lakes, the waters of which never attain the low temperature of the streams within the same region of country, seems to more than compensate for the more northern longitude of this route.

The tables in the Appendix will show the dates of the first arrivals of sailing vessels at the port of Quebec (indication of the river being free of ice), and the dates of the opening of the port of Buffalo and of the navigation upon the Erie and the Canadian canals. (*i*)

The first has been furnished by the Trinity Board at Quebec, and the others have been taken from the reports of the canal Commissioners of the state of New York, from the reports of the Canadian Board of Works and other official reports.

It should be remarked, that, as respects the downward trade of the lakes, the first and last voyages of the season of navigation upon the canal between Buffalo and Albany occupy about ten days, and between Oswego and Albany about five days, while the voyage between lake Erie and Quebec by steam vessels would occupy five days and from lake Ontario three days.

The mean for the last ten years as derived from these tables is as follows:—

Straits of Mackinaw	Opens	Closes
Port Colborne	“	“
Port of Buffalo	“	“
Port of Oswego	“	“
Port of Albany	“	“
Port of Montreal	“	“
Port of Quebec	“	“
Bic	“	“
Erie Canal	“	“
Welland Canal	“	“
St. Lawrence Canals	“	“
Cornwall Canal	“	“
Beauharnois Canal	“	“
Lachine Canal	“	“
St. Lawrence River between Lake Ontario, Montreal and Lachine	“	“
Do. between Montreal and Quebec	“	“

Taking into account the difference in time between the voyages from Lake Ontario to Albany or Quebec, and the dates of the opening of the navigation on the two routes, it appears that the navigation is open about five days earlier and is closed about days on the St. Lawrence route than it is on the Erie Canal.

The large emigrant passenger business which is now concentrated almost exclusively upon New York, might, we should think by proper exertions, be shared by the port of Montreal, and much in that way drawn to that port, whence a return cargo of flour or grain would be always certain. The emigrant can be carried to Montreal from Europe for the same charge as to New York with equal profit, and he can be forwarded from Montreal to the Western States for less expense to himself than from the port of New York.

If with these conditions, a share of this business cannot be drawn to Montreal now, there must exist prejudices and drawbacks unknown to us which time will ameliorate or remove.

The examination of the question of the location of the proposed harbour at Montreal was also very carefully investigated by the late Capt. Childe, and in the following remarks upon that branch of the question his views will be generally quoted.

The foregoing considerations bring us to the conclusion that the Harbour Commissioners are right in their views respecting the need of an early extension of the Harbour of Montreal. As now situated, it is at best only a summer harbour, suited to the domestic, coastwise, and river trade, and affording very inadequate accommodation for even the limited number of sea-going vessels of large size which now visit that port. (*j*)

"When the channel below Montreal is enlarged to the depth of twenty feet (which will be done by 1860), the increased number of this class of large vessels together with those of a smaller size from the ocean, and the lake craft which will be attracted to this port by the improvements of the route above Montreal, will more and more demonstrate that the present harbour accommodations are entirely inadequate to meet the increased requirements of the

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(*g*) See Appendix G.

(*h*) See Appendix, note H.

(*i*) See Apendix, note I.

(*j*) See Appendix, note J.

trade which will year by year be drawn to this point." The objections to the present harbour are, that it is too limited in extent to accommodate the present amount of commerce, and that unless it be enlarged and improved it will seriously retard the growing trade of the St. Lawrence route; that it does not possess a sufficient area of deep water to accommodate the number of large vessels now running to that port, and that the increased depth cannot be given without endangering the present wharves and rendering the construction of new ones necessary; that it is subject to the fluctuations of the waters in the St. Lawrence, and exposed at some seasons of the year to driving ice, so that vessels must leave the port in the fall and seek refuge in some of the sheltered bays below Montreal.

The several plans for the improvement of the Harbour which have been presented to us are as follows: (*k'*)

1st. An inland harbour north of Hochelaga Bay.

2nd. An inland harbour at Viger square.

3rd. An elevated harbour at Point St. Charles.

Estimates of the comparative cost of these several plans have been prepared by Mr. Forsyth, the engineer of the Harbour Commissioners, which were reviewed by the late Captain Childe. (*l'*)

From the great difficulties and somewhat unusual magnitude and character of the works required for each of these plans, any estimate of their cost must to a certain extent be uncertain. It is probable that the expense of works upon either of the plans presented would be greater than the estimates, but they are relatively sufficiently accurate for a comparison of the merits of the several plans.

The site proposed for the harbour at Hochelaga Bay is three miles distant from the Merchants' Exchange and about one fourth of a mile north of the river, in a depression which is the extension of the Craig Street valley.

The level of the surface of the water in the proposed harbour would be thirty seven feet above the level of the water in the river, and the communication between the basin and the river would be made by two locks located at the north end of the basin and connecting with the river along the valley of the small stream which discharges into Hochelaga Bay. The basin would be excavated so as to give a depth of 20 feet of water over an area of——acres, and it would be surrounded by wharves of stone masonry resting on timber cribs filled with stone. Graving and repairing docks would be built on the south side of the basin, discharging the surplus water into the river by a conduit.

The water required for lockage would be supplied by a conduit from the head of the Lachine Rapids a distance of eleven and one half miles, with a fall of nine and a half feet, and at an estimated cost of £504,330, or would be elevated from the river by fixed pumping machinery driven by steam power, which Mr. Childe estimated would cost £34,560, and an additional sum of £17,000, per annum to run and maintain the works. Mr. Childe expressed his opinion very decidedly against this location of the harbour, and in this opinion the undersigned coincide, for the reason that it would disturb all the present located commercial business of the city and either compel the abandonment of the warehouses and wharves now constructed, or separate the domestic and the foreign business, to the great inconvenience of the trade. It would also tax the commerce with the delay and expense of the passage of all vessels which came into port, either from sea or from the interior, into and from the basin. These inconveniences and extra expenses would in the opinion of the undersigned so interfere with and tax the commerce of the port as to neutralize any advantage which might be anticipated from this location of the harbour.

We cannot however overlook the admirable position of Hochelaga Bay itself for the transaction of the large timber business of the Port of Montreal.

The vast timber products of the Ottawa and its tributaries, which must be brought by water and rail to the St. Lawrence, can meet the ocean ship at this point, and then be loaded with a facility which no other point on the harbour presents.

At Albany and Troy, when the canal craft meets the coasting vessels, many miles of wharves are required to conduct the lumber business which in both of these places is a large source of revenue to the towns.

Hochelaga Bay will soon become occupied in the same manner, and will relieve the commercial harbour wherever located, from a kind of business which the experience of other places shows could not be done contiguous to it without interference with the other trade.

The remarks of Mr. Childe on the Viger Square project are as follows:—

"The extension of the Lachine Canal from the upper level of the St. Paul lock through the city to Viger Square, and the construction *there* or at some other lower portion of the Craig Street valley, of a dock-harbour for sea-going vessels, and a connecting ship-canal thence to Hochelaga Bay, would have been a judicious harbour location and a suitable termination of the canal, had it been undertaken at an early period, before the city population had densely spread improvements through said valley, which now render such location and connection of canal and harbour, it seems to us, totally impracticable on account of the great destruction of property and other damages that must accrue." This scheme would bring the water fifteen feet deep at the Hay Market, twenty and one half feet deep at St. George's Street, fifteen and a half feet deep at St. Dominick Street, and fifteen and a half feet deep at St. Denis Street: this high level being the only one favorable for a ship-canal to the River at Hochelaga Bay, while the upper level of the St. Gabriel lock being nine and a half feet lower, and too low for a twenty feet depth of lock and canal.

"The difficulty, then, (apart from the destruction and damage to city improvements,) is that the ground south of Viger Square is much too low for the Canal extension at the required level as compared with the higher ground at and north of that square where deep-water accommodation is required."

The undersigned fully concur with the opinion expressed by Mr. Childe that this plan is now impracticable on account of the great destruction of private property and the consequent cost, and also because it is liable to the same objections though not to the same extent as the Hochelaga scheme.

The project for a harbour at Point St. Charles contemplates the construction of an embankment from the northern abutment of the Victoria Bridge, nearly perpendicular thereto and nearly parallel to the currents of the river for four thousand feet to a point south-east of Wind-mill Point, and thence at right angles fourteen hundred feet to the shore near the old outlet-lock of the

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(*k'*) See Appendix, note K'.

(*l'*) See Appendix, note L'.

Lachine Canal, enclosing an area of about one hundred and thirty acres.

The surface of the water in this basin would be elevated twenty feet above the level of mean low water in the St. Lawrence, and would be connected therewith at the eastern end of the basin by a lock with a chamber four hundred feet long and seventy-five feet wide in the clear, provided with an intermediate pair of gates placed 150 feet below the upper gates, so as to lock vessels of smaller size with more economy of water.

It is also proposed to connect the basin with the Lachine Canal by a lock of five feet lift, chamber 400 feet long and 75 feet wide, and to provide for graving and repairing docks.

The area enclosed by the embankment is chiefly shoal water, and will require but a small amount of excavation to give the requisite depth in the basin. Along the embankment of the Grand Trunk Railway (which forms the enclosure of the western end) and the north side of the basin, an excavation of from one to four feet of rock would be required to obtain the depth of twenty feet in this portion of the basin. This rock would be needed for the outside protection of the enclosing bank.

The whole basin would be surrounded by a puddle wall to prevent the waste of water, and the outside embankment protected from the river currents and ice by a heavy revetted wall. The western end of the basin would be effectually protected from the river by the railway embankment and bridge abutment; while on the river side, the direction of the current being nearly parallel to the enclosing bank, would not in ordinary cases subject it to much danger when the ice is passing down the river. Mr. Childe examined the question of supplying the dock at this location with water, and we quote from his notes as follows:

"Three modes of supplying water for dock purposes at this point are suggested. First, from the Lachine Canal, by increasing the section of said canal every where to its full width, which would let down enough more water to supply the dock, and with less current probably to obstruct navigation than is now experienced in the narrow rocky reaches above.

"Second, from the tail-race of the Water-Works, which would give an ample supply so long as the pumps shall be worked by water-power, the bottom of the wheels being four feet above the surface of water in the proposed dock; and the distance being 1¾ miles, gives fall sufficient to prevent back-water upon the wheels.

"But neither of these sources will be as constantly reliable as is desired. At best, both are but secondary to other and prior uses; while the regular working of the harbour locks is of the utmost importance, and should not be subject to adverse control or accidents, which might at times cut off the supply. An independent source therefore will be greatly preferable, and this is happily at hand, forming the third mode of supply; which is to take water from the head of the Lower Lachine Rapids above Knox's mill by an open canal 5½ miles long with a mean width of 20 feet and depth of 7 feet, and a fall of 13¼ feet, which will deliver at Point St. Charles three times as much water as the dock will require, for the estimated cost of £80,125, including right of way for a canal three times wider and ten feet deep, which may be made to bring down a very large amount of water for manufacturing purposes, beyond what will be needed for the dock.

"In fact, there is a legitimate relation between the manufacture of flour and the very extensive traffic in wheat and flour which the new dock is designed to accommodate; and when joined to the cheap freights of seven to nine hundred ton vessels west from Montreal, and with one thousand to twenty-five hundred tons seagoing vessels east from the same port, and with Railways from the dock *via* Victoria Bridge to all parts of the Eastern States, it is very clear that the milling power so easily brought from the rapids to the proposed dock and its vicinity will serve to render Montreal one of the largest wheat and flour markets in North America; and secondarily, for general manufacturing purposes, the Harbour Commissioners, statesmen, and capitalists can confer no greater benefit upon the Province of Canada and industrial population of Montreal than by developing this water power, and leasing it to enterprising individuals who will thereby create a diversity of labor and furnish employment to thousands who would otherwise be idle.

"Water for the dock for milling and other manufactures, can all be passed through the same canal by carrying it over the St. Pierre River and the Water-Works tail-race at one and the same point, and under the Grand Trunk Railway by a very shallow syphon.

Montreal will then enjoy the advantage not possessed by any other sea-port within our knowledge, of delivering wheat from the lake vessels to the mills on one side, and of rolling the flour from the other side into sea-going vessels for export, or into cars for consumption in New England. The surplus water will pay interest upon three times its cost. (*m'*)

"From all these considerations, and from the vast amount of Western trade likely to take the St. Lawrence route, we are united in opinion that a dock harbour of one hundred and ten, to one hundred and thirty acres, is the best form for a permanent increase of accommodation, and that Point St. Charles is very much the best site therefor.

"The cost of construction, including the £80,125 for an independant supply of water, as before explained, is estimated by the engineer, Mr. Forsyth at £510,000.

"It is not necessary that the whole work should be executed at once and before any part could be brought into use. The enclosing banks faced with stone upon the top and river side, puddle walls, lock and two or three piers will be the extent of the first constructions. Afterwards, as the commerce of the port increases, the work of excavation, inner facing with crib-work and masonry, and other piers, may be carried on from time to time without interfering with the use of all parts previously completed."

"It is unnecessary for us in this report to enter upon the details of construction. We simply advise that the largest area, sheltered by the railway works from drifting ice, be enclosed; that one lock 400 feet by 75 in the clear, with an itermediate pair of gates 150 feet from the head gates be adopted; also that solid crib work be used for inside walls from the bottom of the dock to within three feet of water surface, and surmounted by 8 or 9 feet of well-dressed stone work."

The undersigned coincide with the opinion of Mr. Childe, that this location and plan for furnishing increased harbour accommodations is without question the best of any of those which have been laid before us, and will without doubt afford better accommodation to the present and anticipated trade than at any other location.

Captain Childe advocates the plan of supplying water to the

(*m'*) See Appendix M'.

locks by an independent canal, by means of which a large surplus will be provided which may be used for milling purposes.

It has been represented to us by some of the best-informed commercial gentlemen of Montreal that there is a present demand for an increased amount of water-power; and that what would be furnished by the construction of the independent canal, would be disposed of upon terms which would repay the cost of construction. (*n'*)

The great advantages which would be given to this route by the development of the valuable water-power which exists at Montreal, has been alluded to in the former portion of this Report, and its value to the city itself has been discussed in the above remarks of Captain Childe. In these opinions also the undersigned agree.

The plan of the dock is complete without this independent hydraulic canal, as it can be supplied with water from either the Lachine canal or the tail-race of the Water-Works, or by pumping from the river, at a less cost than by the independent canal; but as the latter may in itself be made a source of revenue, and as has been stated a valuable adjunct to the route, it will doubtless be found expedient to construct it at an early day, although its cost is not chargeable to the scheme of the dock.

GENERAL REMARKS.

It will be observed, that the enlargement of the locks of the Welland Canal, so as to allow the largest class of vessels which can navigate the upper lakes (eight hundred tons) has been assumed as necessary to the success of the whole system of Canadian works; and that whenever this shall be done, the contest for the Western trade will be between the ports of Oswego and Montreal.

That portion of the Western and Upper Canadian trade which is to seek foreign markets can then be transported on the downward trip, at less cost by the St. Lawrence route than by the way of New York.

The importance of the up cargoes has been already discussed; and the influence upon the cost of transportation by this route must be duly considered before its full advantages can be determined.

The foreign export of the agricultural products brought to the seaboard by the New York works forms but one third of the whole, while the home demand consumes two thirds. As a general proposition it may be stated that the imports will follow the same course as the exports; and hence that although the improved St. Lawrence route will present strong inducements for the one third of the trade, yet if the preponderance of the remainder of this trade is left to the New York route, it will materially aid that line in its contest for even the foreign trade, by giving to it the upward cargoes which tend so much to cheapen transport.

The construction of the proposed Caughnawaga Canal from the St. Lawrence opposite Lachine to Lake Champlain, will allow the large lake vessels to continue their voyage to Whitehall (two hundred and ten miles from New York, and one hundred and thirty-seven miles nearer the seaboard, than can be done by the way of Oswego), at twenty cents per ton less cost, even if the Champlain Canal should not be enlarged so as to allow the vessels to go to New York.

The economy of time and transport by the Lake Champlain route could not fail to attract to it a large share of the trade between the Western States and New England, as well as a portion of the New York trade.

This diversion of business would all pass through the St. Lawrence canals, and would prove a highly productive source of revenue to those works, which have never hitherto more than paid the cost of maintenance.

This course of trade, once established, would tend to reduce the expense of transport to and from Montreal to a minimum, by giving to the vessels those return cargoes, the value and importance of which have been so fully commented upon.

It may not be generally understood that the vessels which would take the Caughnawaga Canal would pass by the mouth of the Lachine Canal and within seven miles of the city of Montreal, and would, when at Burlington or Whitehall, be nearer to any of the towns of New England than when at Albany.

The Lachine Canal affords a most admirable opportunity for the erection of warehouses for the reception of grain, flour, and other Western products; because from this point such products may, during the summer, be despatched by water to all foreign ports by the St. Lawrence, and also to the nearest water approach to New England, and also to New York itself; and during the suspension of navigation, by railway to all of the Canadian and American North-eastern Atlantic ports,—in both cases with less expense of time or money than from any other point which can be reached by the lake craft.

These Western products may then be shipped to Montreal; and their final destination, whether to foreign or domestic ports, be determined when the vessel has arrived at Lachine, as the price of the article in the various markets best indicates.

The enlargement of the locks of the Welland Canal, the construction of the Caughnawaga Canal and docks at Montreal, and the completion of the river improvements, should be prosecuted simultaneously, and all of them are necessary for a full development of the advantages of the St. Lawrence route.*

The lengthening of the locks of the St. Lawrence canals, although important, is an improvement which can be postponed without any serious detriment. Nor is the public interest confined to the water-lines of the St. Lawrence; the Province s having a large pecuniary interest in the Railways of Canada.

It is impossible to secure the carrying trade between the West, or even of Upper Canada and the seaboard by railways, against the cheap water-routes through New York; but the success of the Canadian railway is intimately dependent upon the diversion of a considerable portion of this trade to the St. Lawrence.

This water-route through the St. Lawrence, when improved, has been shown to be cheaper than any other to the sea-board; and when it shall have drawn to itself the business to which it is legitimately entitled, there must go with it such an amount of passengers and light freight traffic, as to give to the parallel railway an increase of business which will be of great value to its revenues.

The remarks which have already been made on this division of business between the water and railway lines, in a preceding part

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(*n'*) See Appendix, note N'.

* Routes for a canal are now being surveyed from Georgian Bay to Lake Ontario and to the Ottawa, by which it is said that some four hundred miles of navigation would be saved to the commerce of Lakes Michigan and Superior. The trade of Lake Erie and the southern portion of Huron would not be affected by this saving of distance The large lockage, great cost, and some serious difficulties in the construction, of either of these canals render the probability of any diversion of the anticipated trade of the Welland Canal too remote to warrant any delay in that work.

of this Report, will further show how dependent each of these systems of transport is upon the other. In the present conditions of trade in this country, neither, as a general proposition, can be successful without the other; and although they are competitors for some kinds of business, yet the advancement of each, (and especially of the water-line), improves the condition of the other.

The Grand Trunk Railway is now extended to Portland, and will soon be completed to Trois Pistoles, on the St. Lawrence, to which latter place the navigation may be rendered available earlier in the spring and later in the fall.

The dates of the opening of the Welland and the St. Lawrence canals compared with those of New-York and the length of the voyages through them, together with this extension of the season by the railway to Trois Pistoles, will give to the St. Lawrence route an advantage which has not been adverted to in the preceding part of this Report.

This advantage will be largely shared in by the Grand Trunk Railway, and especially on that portion of it eastward of Montreal; nor is it improbable that the Railway system of Canada may be extended through New Brunswick to Halifax in Nova Scotia, and, by a Federation of the Provinces under one general government, which has already been agitated and will no doubt be accomplished at an early day, together with the circumstances already alluded to, point to the advisability and security of providing the largest accommodation for the trade at a point which may be so admirably adapted to its transhipment and distribution as that of Montreal.

In the examination of these subjects, we have labored under the disadvantage of the want of an intimate acquaintance with the condition of the trade of Canada which a residence would have furnished. Our remarks have therefore taken a wider range so as to embrace those districts with which we are more familiar, but which are also deeply interested in the improvement of the St. Lawrence route.

To the people of Canada however these are questions of still deeper interest. With a climate, soil, and productions at least equal to the contiguous districts of the United States, and having the means of securing not only the cheapest channel to the ocean but also the cheapest to New England and New York, her future progress must be vastly accelerated.

The countless emigration from Europe which has hitherto passed almost in sight of her rich, healthy, and well-situated lands, to seek abodes in the Western States, far removed from the world's markets, and oftentimes in unhealthy climates, and on lands but little if any better than those which lie unoccupied along the water-courses which discharge into the St. Lawrence, will, when these advantages are availed of, settle within her borders, and greatly add to her wealth and prosperity.

A liberal expenditure for the completion of the magnificent public works along the St. Lawrence cannot fail to divert to this route a large share of the trade and travel between the West and Atlantic, and while this will recompense for the expenditure, it will not only add to her commercial prosperity, but will also render her unrivalled advantages known to the stream of emigration which in flowing through her channels must be largely attracted to her territory.

The conclusions to which the Board have arrived may be briefly stated as follows:—

1st. That the natural advantages of the route between the western interior and the sea-board by the way of the St. Lawrence are sufficient to warrant the expenditures which have been made, and also those which are proposed to complete the improvements along that route; and that when thus improved, it will present the cheapest mode of communication not only to the sea-board, but also to New-England and New-York.

2nd. That the amount of business which will be drawn to this route by the advantages which it will possess when so improved, will be sufficient to warrant the expenditures necessary in making them.

3rd. That the port of Montreal is the proper place for transferring cargoes from the interior to sea-going vessels; and therefore that the Harbour Commissioners are right in their plans for deepening the channel below Montreal so as to allow vessels drawing twenty feet to come to the latter port.

4th. That the present harbour facilities of Montreal are entirely inadequate to accommodate the present trade; and that such an increase as may be expected on the completion of the improvements already mentioned, will require a large addition thereto.

5th. That the location of an enlarged harbour at Point St. Charles is the best site that can be found at Montreal; and that the facilities which a harbour at this place, upon the plan suggested, will amply accommodate the trade in question; and finally, that in our opinion the improvements in the channel of the St. Lawrence at and near Montreal, and the construction of the proposed harbour, are not local questions but of national importance, by which the final success of the scheme of Canadian public works will be materially influenced.

HARBOUR OF MONTREAL.

The following remarks on the project of extending the Harbour of Montreal in front of the City, were inadvertently omitted by the Engineers, Messrs. W. T. McAlpine, and James P. Kirkwood, in their printed Report, and are now authorised by them to be appended to the same :—

The examination of the plan for enclosing the front of the present harbour by a breakwater, and deepening the harbour itself by dredging, was also made by the late Captain John Childe. His views upon the subject were as follows :

Next in order is the suggested plan of enclosing the present River Harbour by a permanent ice-barrier extending in an easterly direction from Wind-mill Point about 1350 feet, and thence 4000 feet in the direction of Monarque Street Wharf, opposite the lower half of St. Helen's Island, and terminating at a point about 650 feet south-easterly from the east end of the Victoria pier. This plan has been presented for consideration with the expectation that it would meet the wants of commerce for many years, be very much cheaper in construction than a dock-harbour, and retain the whole traffic upon the natural river level. But on examination we find this plan will enclose an area of about 110 acres, exclusive of the present wharves and deepest water, and will require to be deepened to 20 feet water by dredging an average of 10 feet, giving 1,777,000 cubic yards of mud, sand and pebbles, which we estimate may be taken out at 2s. per yard, or total cost of £177,700. Then a suitable ice-barrier, exposed as this would be to the action of the water and ice, would cost, as we estimate, not less than £60 per lineal foot, and for the whole enclosure of ground, 5350 feet,

whole enclosure of ground, 5350 feet,	£321,000
Dredging, as above,	177,700
A total of	£498,700

If by this plan the future wants of commerce could be answered, there would be some reason for its adoption ; but such a harbour does not, in our judgment, meet the leading requirements before stated, to wit : safe and convenient storage at all seasons ; convenient accessibility by carts and railroad cars ; and the facility of separating the transit from the distributing trade. We think that the risk to property stored upon or contiguous to such a barrier in winter will be greater than at any other point proposed ; that the whole structure, without piers and warehouses, will be out in the river and inaccessible by carts and cars, except via lower bridge of Lachine Canal or ferry-boats ; that the river and coastwise domestic trade being immediately connected with the general population of the city, will continually require all of the present river harbour in front of and below the city, but will not need the deep water or expensive ice-barrier, and warehouses called for by the transit, interior and foreign trade. If the whole domestic and foreign trade were confined for some years to the present harbour by the deep dredging and expensive structure before mentioned, the time will come when more space must be needed ; and at any time the transit foreign trade may be more favorably detached to a position contiguous to the present harbour and to the city than can be the domestic, river and coastwise trade. The latter does not now, nor will it probably for fifty years, require more and larger accommodation than the river and its western branch afford ; but it is to cheapen, develope and guard the transit and foreign trade that deeper water and larger and better harbour facilities are called for. We therefore advise the construction of those where they will for all time be devoted to the transit and foreign trade, leaving the domestic trade undisturbed where convenience has already placed it, and where it will need but very light expenditures from time to time for its enlargement. By this course the *ultimate* cost of harbour facilities for all species of trade will be greatly lessened ; and for the next three or four years, whilst the work of a permanent and contiguous dock-harbour shall be in progress, no interruption or curtailment will be experienced in the use of the present harbour.

In advising, therefore, against the third scheme, we turn with more confidence to the *fourth* and last position at Point Saint Charles.

The undersigned are of opinion that this plan of enlarging and partially protecting the present harbour would be inadequate to meet the requirements of the commerce which will be attracted to the St. Lawrence route, when it shall have been improved in the manner herein contemplated. This plan would only accommodate a limited amount of trade, and would be only a Summer harbour, and would not afford sufficient refuge for vessels when the ice is driving in the river.

W. J. McALPINE,
JAS. P. KIRKWOOD.

NOTE.

The following private notes and observations of the late Capt. John Childe, in reference to the improvement of the Harbour of Montreal, having been received since the meeting of the Board of Trade on the 21st instant, the Harbour Commissioners deem it important that the same should be communicated in full to the members of that body.

From Capt. Childe's Note Book.

Montreal Harbour.

The foregoing considerations bring us to the conclusion that the Harbour Commissioners are right in their views respecting the need of early extension of the Harbour of Montreal. As now situated, it is at best only a summer harbour, suited to the domestic, coastwise and river trade, and affording in all respects very inadequate facilities for the few sea-going vessels of large class which reach Montreal by the improved channel of 18 feet water; and when this channel shall be carried to a depth of 20 feet, as may so readily be done, the deficiency of Harbour accommodation will be more and more seriously felt as the size and number of such vessels increase, as they are sure to do, until they reach the maximum suited to the completed 20 feet channel, and to the vastly extended trade from the west, which the enlargement of the Welland Canal, milling power at Montreal, and other improvements before spoken of, must inevitably draw to Montreal for storage and export to foreign countries, or distribution to the north-eastern states.

The practical question for us now to arrange is therefore, where and how can the Harbour be extended most advantageously, all things considered, to meet the present and future wants of domestic (and foreign) commerce via the St. Lawrence route.

But before proceeding to answer from a comparison of the several proposed sites, we will state:

1st. That any additional Harbour accommodation should be in place and form adapted to the general and particular traffic for which its facilities may be required.

2d. That it should be a Harbour of protection for repair or building of vessels, and for safe and convenient storage in winter as well as in summer.

3d. That it should be a part of or near to the present summer Harbour, and communicate conveniently therewith, and also with the Lachine canal.

4th. That it should be as near as practicable to the commercial portion of the city, for the convenience of the distribution trade which must become very extensive, and has already made Montreal the chief importing city of Canada.

5th. That it should be accessible by railroad cars, and thus be brought at all seasons, especially in winter, into convenient connection with the west, with Quebec, Portland and Boston, and with the interior manufacturing towns of New England.

6th. That it should afford especial facilities to the transit trade, by bringing the lake and sea-going vessels side by side or to the opposite sides of the same warehouse, that one may discharge directly into the other, or both at pleasure to and from store, without the expense, delay, or waste of cartage.

And 7th. (The preceding conditions of service being fulfilled), it should be so situated as to obtain, with reasonable expense, an ample supply of water for dock uses, and in connection therewith, bring to the Harbour and to its vicinity from the Lachine rapids, a large amount of water for milling wheat into flour and for general manufacturing purposes.

Keeping these important objects and uses in mind, we pass to a particular examination of each scheme presented for Harbour improvement. And first we take up that proposed for Hochelaga Bay.

We find here a sufficient area of farming alluvial land apparently free from rocks, and situated in the depressed portion of the Craig street valley about three miles north from the Exchange and Custom House. A dock Harbour of any needed size and depth can here be excavated some rods, and the bottom of the dock about 17 feet above the river at low water level, giving with 20 feet depth of water, 37 feet lockage to the river, and very good building grounds on all sides of the Harbour.

The connection with the river is suitably proposed at the mouth of the brook, a little north of the New Hochelaga wharf, where a narrow belt of deep and nearly still water is found between the bank and strong river current, favorable for bringing vessels to the entrance of the locks.

The river channel also is deep enough here for any vessel that can come up from tide water, but is much narrower than above or below the island, and consequently the current is very strong. Thus far considered, the Hochelaga site is very practicable, but, to obtain a supply of water for it, is a far more serious matter. The quantity required for one lockage every three-fourths of an hour is 165 cubic feet per second. This cannot be taken from the Lachine canal by pipe through Craig street, the fall being nine feet, without increasing the velocity of the current detrimentally to the navigation, unless the canal is made wider, nor from the tail race of the water works, because the surface of the proposed Hochelaga Harbour must be 10 feet higher than said tail race. It remains then to bring in water by a separate conduit from the head of the Lachine rapids, a distance of 11½ miles, and total fall of 9½ feet, the estimated cost of which is £504,330, or to furnish the required supply from the river at the nearest point to the dock, an average lift of 37 feet, which will cost for fixed pumping machinery £34,560, and the annual expenses for seven months' navigation will be, including interest and depreciation, about £17,000. Either of these modes of supply is objectionable. The first, because of its insuperable cost, and the second on account of the great annual cost of working, and especially the risk of breakage or explosion to which such machinery is always liable; and we cannot believe it judicious to trust the operations of the very large tide of commerce which moves through the proposed Harbour, to the casualties that may and do often interrupt the working of the best steam machinery.

The most favorable ground for the Hochelaga dock will carry its centre three miles from the Merchants' Exchange, or, by very greatly increasing the amount and cost of excavation, it might be brought half a mile nearer by moving half its length south and keeping the lock entrance from the river as before; but the average distance of 2½ or 3 miles would prove a great inconvenience and expense to the business of the city, equal in cost of cartage alone at 10 cents per barrel to the freight charges inland for 200 miles, or for 500 miles of ocean transit. Nor could there be any connection with the Lachine canal except by locking to and from the river, or any reasonably cheap way of bringing water here from the Lachine rapids for milling or other manufacturing purposes.

We find, therefore, that the scheme for a Dock Harbour near Hochelaga Bay fulfils only the 2d of the seven conditions of service before stated, and is so distant, isolated and expensive (see estimate in the Appendix), that we deem it unworthy of further consideration, and we advise its rejection.

"The extension of the Lachine Canal from the upper level of the St. Paul lock through the city to Viger Square, and the construction *there* or at some other lower portion of the Craig Street valley, of a dock-harbour for sea-going vessels, and a connecting ship-canal thence to Hochelaga Bay, would have been a judicious harbour location and a suitable termination of the canal, had it been undertaken at an early period, before the city population had densely spread improvements through said valley, which now renders such location and connection of canal and harbour, it seems to us, totally impracticable on account of the great destruction of property and other damages that must accrue." This scheme would bring the water fifteen feet deep at the Hay Market, twenty and one half feet deep at St. George's Street, fifteen and a half feet deep at St. Dominick Street, and fifteen and a half feet deep at St. Denis Street: this high level being the only one favorable for a ship-canal to the River at Hochelaga Bay, while the upper level of the St. Gabriel lock being nine and a half feet lower, and too low for a twenty feet depth of lock and canal.

"The difficulty, then, (apart from the destruction and damage to city improvements,) is that the ground south of Viger Square is much too low for the Canal extension at the required level as compared with the higher ground at and north of that square where deep-water accommodation is required."

Next in order is the suggested plan of enclosing the present River Harbour by a permanent ice barrier extending in an Easterly direction from Wind-mill Point about 1350 feet, and thence 4000 feet in the direction of Monarque Street Wharf, opposite the lower half of St. Helen's Island and terminating at a point about 650 feet south-easterly from the east end of the Victoria pier. This plan has been presented for consideration with the expectation that it would meet the wants of commerce for many years, be very much cheaper in construction than a dock-harbour, and retain the whole traffic upon the natural river level. But on examination we find this plan will enclose an area of about 110 acres, exclusive of the present wharves and deepest water, and will require to be deepened to 20 feet water by dredging an average of 10 feet, giving 1,777,000 cubic yards of mud, sand and pebbles, which we estimate may be taken out at 2s. per yard, or total cost of £177,700. Then a suitable ice-barrier, exposed as this would be to the action of the water and ice, would cost, as we estimate, not less than £60 per lineal foot, and for the whole

enclosure of ground, 5350 feet, ...	£321,000
Dredging, as above, ...	177,700
A total of	£498,700

If by this plan the future wants of commerce could be answered, there would be some reason for its adoption; but such a harbour does not, in our judgment, meet the leading requirements before stated, to wit: safe and convenient storage at all seasons; convenient accessibility by carts and railroad cars; and the facility of separating the transit from the distributing trade. We think that the risk to property stored upon or contiguous to such a barrier in winter will be greater than at any other point proposed; that the whole structure, without piers and warehouses, will be in the river and inaccessible by carts and cars, except via Island Wharf or ferry-boats; that the river and coastwise domestic trade being immediately connected with the general population of the city, will continually require all of the present river harbour in front of and below the City, but will not need the deep water or expensive ice-barrier, and warehouses called for by the transit, interior and foreign trade. If the whole domestic and foreign trade were confined for some years to the present harbour by the deep dredging and expensive structure before mentioned, the time will come when more space must be needed; and at any time the transit foreign trade may be more favorably detached to a position contiguous to the present harbour and to the City than can be the domestic, river and coastwise trade. The latter does not now, nor will it probably for fifty years, require more and larger accommodation than the river and its western branch afford; but it is to cheapen, develope and guard the transit and foreign trade that deeper water and larger and better harbour facilities are called for. We therefore advise the construction of those where they will for all time be devoted to the transit and foreign trade, leaving the domestic trade undisturbed where convenience has already placed it, and where it will need but very light expenditures from time to time for its enlargement. By this course the *ultimate* cost of harbour facilities for all species of trade will be greatly lessened; and for the next three or four years, whilst the work of a permanent and contiguous dock harbour shall be in progress, no interruption or curtailment will be experienced in the use of the present harbour.

In advising therefore, against the third scheme, we turn with more confidence to the *fourth* and last position at Point Saint Charles.

Here we found a large and naturally unavoidable area of shallow water, well protected by the abutment and bank of the Grand Trunk Railway from the swift currents and downward flow of river ice; and by enclosing it on two sides, beginning at the Victoria Bridge abutment, and running parallel with the high-water current about 4000 feet to a point east of the Windmill Point, thence to the same point about 1400 feet, an area of about 130 acres will be conveniently secured for harbour purposes. The enclosing bank will be made water-tight by a vertical puddle wall, and covered on the outside slope by the rock excavated from the inside and bottom. At the centre of the north side a ship-lock, 75 by 400 feet chamber, will connect the enclosed space with the present harbour and river channel. Thus by a lock-lift of 20 feet, and the shelter afforded by the railway, you will acquire for first-class sea-going vessels as much useful area as is now furnished by the unprotected river harbour for river and coastwise transports. We believe that a dock-harbour thus situated, will be perfectly safe from water and ice floods, and meet fully and substantially all of the requirements before stated :—1st. As a depository for grain, flour, and prepared lumber from the west and north, and for cargoes of foreign merchandise ; 2nd. As a safe place for storage, for ship-building, repairs, and for milling or manufacturing purposes ; 3rd. As most convenient for communication with both the River, Harbour and Lachine Canal ; 4th. As near as practicable to the city (the centre being ⅞ths of a mile from the Merchants' Exchange), and of more convenient access by carts and cars than any erections could be, for enclosing the present harbour ; and 6th. As peculiarly well adapted by absence of currents for bringing the lake and sea-going vessels side by side for the cheapest transhipment of rolling freights and lumber, or to the same warehouse for grain. All these objects and uses unite to make Point St. Charles the most suitable place for your harbour improvement ; while the 7th and last consideration, for bringing here a large quantity of water for dock and milling purposes, cannot be applied to any of other locations without costing more than it is worth.

"Three modes of supplying water for dock purposes at this point are suggested. First, from the Lachine Canal, by increasing the section of said canal every where to its full width, which would afford enough surplus water to supply the dock, and with less current probably to obstruct navigation than is now experienced in the narrow rocky reaches above.

"Second, from the tail-race of the Water-Works, which would give an ample supply as long as the pumps shall be worked by water-power, the bottom of the wheels being four feet above the surface of water in the proposed dock ; and the distance being 1¾ miles, gives fall sufficient to prevent back water upon the wheels.

"But neither of these sources will be as constantly reliable as is desired. At best, both are but secondary to other and prior uses ; while the regular working of the harbour locks is of the utmost importance, and should not be subject to adverse control or accidents, which might at times cut off the supply. An independent source therefore will be greatly preferable, and this is happily at hand, forming the third mode of supply ; which is to take water from the head of the Lower Lachine Rapids above Knox's mill by an open canal 5½ miles long with a mean width of 20 feet and depth of 7 feet, and a fall of 13¼ feet, which will deliver at Point St. Charles three times as much water as the dock will require, for the estimated cost of £80,125, including right of way for a canal three times wider and ten feet deep, which may be made to bring down a very large amount of water for manufacturing purposes, beyond what will be needed for the dock.

"In fact there is a legitimate relation between the manufacture of flour and the very extensive traffic in wheat and flour which the new dock is designed to accommodate ; and when joined to the cheap freights of seven to nine hundred ton vessels west from Montreal, and with one thousand to twenty-five hundred tons sea-going vessels east from the same port, and with Railways from the dock *via* Victoria Bridge to all parts of the Eastern States, it is very clear that the milling power so easily brought from the rapids to the proposed dock and its vicinity will serve to render Montreal one of the largest wheat and flour markets in North America ; and secondarily, for general manufacturing purposes, the Harbour Commissioners, statesmen and capitalists can confer no greater benefit up on the Province of Canada and industrial population of Montreal than by developing this water power, and leasing it to enterprising indviduals who will thereby create a diversity of labor and furnish employment to thousands who would otherwise be idle.

"Water for the dock for milling and other manufactures, can all be passed through the same canal by carrying it over the St. Pierre River and the Water-Works tail-race at one and the same point, and under the Grand Trunk Railway by a very shallow syphon.

Montreal will then enjoy the advantage not possessed by any other sea-port within our knowledge, of delivering wheat from the lake vessels to the mills on one side, and of rolling the flour from the other side into sea-going vessels for export, or into cars for consumption in New-England. The surplus water will pay interest upon three times its cost.

"From all these considerations, and from the vast amount of Western trade likely to take the St. Lawrence route, we are united in opinion that a dock harbour of one hundred and ten, to one hundred and thirty acres, is the best form for a permanent increase of accommodation, and that Point St. Charles is very much the best site therefore.

"The cost of construction, including the £80,125 for an independant supply of water, as before explained, is estimated by the engineer, Mr. Forsyth at £510,000.

"It is not necessary that the whole work should be executed at once and before any part could be brought into use. The enclosing banks faced with stone upon the top and river side, puddle walls, lock and two or three piers will be the extent of the first constructions. Afterwards, as the commerce of the port increases, the work of excavation, inner facing with crib-work and masonry, and other piers, may be carried on from time to time without interfering with the use of all parts previously completed."

"It is unnecessary for us in this report to enter upon the details of construction. We simply advise that the largest area, sheltered by the railway works from drifting ice, be enclosed ; that one lock 400 feet by 75 in the clear, with an intermediate pair of gates 150 feet from the head gates be adopted ; also that solid crib work be used for inside walls from the bottom of the dock to within three feet of water surface, and surmounted by 8 or 9 feet of well-dressed stone work."

The preceding considerations bring us to the conclusion that the Harbour commissioners are right in their views respecting the need of an early extension of the Harbour of Montreal. In its present condition it is at best only a summer harbour devoted to the domestic, coastwise and river trade, and affording in all respects very inadequate facilities for the few sea-going vessels of large class which now reach Montreal, by the improved channel of 17 feet water ; and where this channel shall be carried to the depth of 20 feet as may so readily be done within the next two years by the moderate additional expenditure of £25,000, the deficiency of harbour accommodation will be more and more seriously felt as the size and number of such vessels increase as they are sure to do, until they reach the maximum suited to the completed 20 feet channel and to the vastly extended trade with the west which the enlargement of the Welland Canal, the milling power of the Lachine rapids, and the railways must inevitably draw to Montreal.

"It has been already shown that the shortest and cheapest route from Chicago to tide-water is viâ the St. Lawrence, and it is admitted by all commercial men that unobstructed transport trade will always take the shortest and cheapest route. As a question of practical economy, it must also be admitted, without the necessity of argument, that vessels properly constructed for the lake and river traffic west of Montreal, will be neither safe nor profitable for the gulf and ocean; nor, on the other hand, would the deeper build of sea-going vessels be suitable for the canals and shallow parts of the river and lakes. It follows, then, that a port of transhipment must be provided. The natural course of Cananadian trade and population has from an early period made Quebec and Montreal prominent centres of both upon the river. These cities divide the river trade, and are together capable of affording all the facilities that the future commerce of the river may require The differences peculiar to each, seem to spring solely from natural causes, to wit: at Quebec the river harbour is deep and broad, the channel from thence to the ocean has always been unobstructed and sufficient for the largest class of vessels. The changes of tidal level (13 and 18 feet respectively for summer and spring) would be detrimental to general traffic, but are of very great advantage in the landing, preparation, and shipment of timber, which is chiefly transported in rafts from the upper country to Quebec. For such reasons the immense timber and lumber trade of the provinces will doubtless continue to be transacted at Quebec.

"Quebec and Montreal must enjoy a very large increase of general traffic by the increase of population in their respective districts, and also by all public works which serve to expedite and cheapen the collection, transportation and distribution of produce and merchandize whether inward or outward bound via the St. Lawrence route.

"It is apparent that the position of Montreal, at the head of ocean navigation and at the foot of the lowest rapids, possesses certain advantages peculiar to itself. It is surrounded by a more populous and fertile region of country, at the confluence of the St. Lawrence, Ottawa and Lake Champlain routes of trade, and the focus towards which the continuous influences of railways and the natural and artificial water-channels of the West and Northwest will more and more concentrate the trade of the lake countries. These countries now number eight millions of people: at the close of another century they will probably come up to twenty millions.

"We notice also, as a proof of the eligible commercial position of Montreal, that in the years preceeding 1856, during which the corn laws of England and all differential duties favoring the direct export and import trade with the Canadas had been repealed, and the bonding system of the United States and the reciprocity treaty with that country established, the ports of the United States became virtually *free* to Canadian trade, thereby diverting from the St. Lawrence route $\frac{13}{16}$ of the Canadian cereal exports and $\frac{5}{8}$ of all imports. Yet the imports into Montreal increased at the same time fifty per cent, but $\frac{11}{16}$ of this increase appears to have accrued on the first year of the reciprocity trade with the United States."

"In 1855 the total imports by the river are stated at	$11,494,028
Total imports from United States ports	20,825,432
Making total imports	$32,319,460

of which Montreal absorbed $12,372,580, or over $\frac{3}{8}$ of the whole; and $878,552 more than the total imports that year by the river. Thus showing Montreal to be largely on the increase, notwithstanding the diversion of the trade from the river to other routes, via Portland, Boston and New-York.

"But the true interests of Canada, and of the North-western Lake States, require that that trade and its future increase shall be restored to the shorter and cheaper route via the St. Lawrence, not by restrictive governmental exactments, but by perfected canals, deepened channels, numerous light-houses and well instructed pilots.

"Other local considerations point to Montreal as the sea-port of the West, and as the proper point of transhipment between sea-going and interior lake vessels.

"1st. Because the larger sea-going vessels can continue their voyage from Quebec to Montreal, one hundred and eighty miles, at less cost per ton than would attend running the smaller interior vessels from Montreal to Quebec; for with the completed twenty feet channel, and corresponding harbour extension at Montreal, there is no reason to apprehend extra risk or detention.

"For instance, a steamer of medium size arrives at Quebec fully loaded with 1200 tons of goods, 250 for Quebec and 950 for Montreal and the West, with an average of 100 passengers. After discharging the Quebec freights, her actual expenses to Montreal and back will be as follows, exclusive of lake dues, which ought to rescinded on the completion of the new channel, if not before:

Pilotage up and down,	$107
Wharfage at Montreal 12 days,	100
Coals consumed, average 70 tons ($280)	280
Sums expended in running up and mooring at wharves two days, for which the pay and subsistence of officersand men will be	140
Interest and insurance (2 days) on cost of ship,	128
Total disbursements Quebec to Montreal and back	755
Add contingent expenses	75
	$830

"If we count each passenger as equal in rate and measurement to two tons, and that the ships take at Montreal for cargo twenty five passengers and 1000 tons, the total movement up and down will be equivalent to 2200 tons, nett cost per ton 38¾ cents, which is 2½ mills per ton per mile, or 3⅞ cents per barrel for flour from Montreal to Quebec. To perform this account of transportation by two medium-sized interior steamers fully loaded with 500 tons each, with passenger accommodations, will be as follows:

Pilotage for both, up and down	$112
Wharfage at Quebec 5 days, ½ ct.	50
Coal consumed 40 tons to each=80	320
	$482

"Prominent merchants largely engaged in the forwarding business between the upper lakes and the ports of Montreal and Quebec, object to sending their steamers to Quebec on account of detentions from the want of suitable wharf space, from the tidal changes, and from the risk of grounding at low water at the wharves; but these evils can be obviated in time by building more wharves and extending them to deeper water, and by a tidal dock for which there exists an admirable site at the mouth of the creek on the north-westerly side of that city. But apart from all local questions, the general accumulation of export products at Montreal, as the terminus of 1500 miles of inland navigation, is much better security against detention of vessels there either for loading or discharging, than can be had at Quebec at any time. We therefore make allowance of one day for each trip in favor of Montreal, and state:

Previous amount brought forward	$482
Three days time in running and mooring at wharves and other detentions, for which the pay and subsistence of officers and men will be	215
Interest and insurance 3 days on cost	192
For contingent expenses $50 each	100
Total by inland steamers	$989

"Which divided by 2200 tons, as before, gives 45 cents per ton=$2\frac{9}{10}$ mills per ton per mile and $4\frac{1}{2}$ cents per barrel of flour. The above shows the comparison between sea-going steamships of 1200 tons and lake vessels of 500 tons. Steamships of 2400 tons are now built for this route, the cost of transport by which, compared with the largest lake craft (800 tons), would show a still larger result in favor of bringing the ocean steamships to Montreal.

The same comparison of sea-going and inland sailing vessel shews a much larger difference in favor of sending ocean vessels to Montreal."

HARBOUR OFFICE,
MONTREAL, *24th April*, 1858.

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